The African Organisation for Standardisation

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ARS 865 (2012) (English): Green grams — Specification

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Green grams — Specification

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Foreword

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Introduction

The mungbean (*Vigna radiata* (L.) Wilczek), also called mung, moong, green gram and mungo, is a leguminous pulse crop, prized for its seeds, which are high in protein, easily digested, and consumed as food. Mungbeans are high in vitamins A, B_1, B_2 and C and niacin.

While grown principally for its high protein seeds, used as human food, the mungbean plant may be utilized as fodder for livestock, or the crop may be incorporated into the soil for soil improvement purposes. For food, the seeds are prepared by cooking, fermenting, milling, or sprouting. They are utilized in making soups, curries, bread, sweets, noodles, solids and other culinary products. Among the pulses, the mungbean is favoured for children and older people due to its easy digestibility and low production of flatulence. Protein content of seeds averages around 22 to 24 per cent. Mungbean protein is comparatively rich in lysine, an amino acid deficient in cereal grains, and deficient in methiomine, cystine, and cysteine, amino acids found abundantly in cereal grains. A diet combining mungbeans and cereal grains compensates for the deficiencies in protein quality found in either grain alone and provides a balanced amino acid content.

Green grams are an important domestic and export crop and this African Standard was prepared to establish harmonized quality and safety characteristics to facilitate domestic, regional and international trade.

Green grams — Specification

1 Scope

This African Standard specifies requirements and methods of sampling and test for the dry whole grains of the green gram of the cultivar *Vigna radiata* intended for direct human consumption.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

AOAC Official Method 2001.04, *Determination of Fumonisins B_1 and B_2 in corn and corn flakes — Liquid chromatography with immunoaffinity column cleanup*

CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

ISO 520, *Cereals and pulses — Determination of the mass of 1000 grains*

ISO 605*, Pulses — Determination of impurities, size, foreign odours, insects, and species and variety — Test methods*

ISO 2164, *Pulses — Determination of glycosidic hydrocyanic acid*

ISO 2171, *Cereals, pulses and by-products — Determination of ash yield by incineration*

ISO 4112, *Cereals and pulses — Guidance on measurement of the temperature of grain stored in bulk*

ISO 4174, *Cereals, oilseeds and pulses — Measurement of unit pressure loss in one-dimensional air flow through bulk grain*

ISO 5223, *Test sieves for cereals*

ISO 5527, *Cereals — Vocabulary*

ISO 6322-1, *Storage of cereals and pulses — Part 1: General recommendations for the keeping of cereals*

ISO 6322-2, *Storage of cereals and pulses — Part 2: Practical recommendations*

ISO 6322-3, *Storage of cereals and pulses — Part 3: Control of attack by pests*

ISO 6639-1, *Cereals and pulses — Determination of hidden insect infestation — Part 1: General principles*

ISO 6639-2, *Cereals and pulses — Determination of hidden insect infestation — Part 2: Sampling*

ISO 6639-3, *Cereals and pulses — Determination of hidden insect infestation — Part 3: Reference method*

ISO 6639-4, *Cereals and pulses — Determination of hidden insect infestation — Part 4: Rapid methods*

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 6888-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

ISO 6888-3, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers*

ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 13690, *Cereals, pulses and milled products — Sampling of static batches*

ISO 16002, *Stored cereal grains and pulses — Guidance on the detection of infestation by live invertebrates by trapping*

ISO 16050, *Foodstuffs — Determination of aflatoxin B_1, and the total content of aflatoxin B_1, B_2, G_1 and G_2 in cereals, nuts and derived products — High performance liquid chromatographic method*

ISO/TS 16634-2, *Food products — Determination of the total nitrogen content by combustion according to the Dumas principle and calculation of the crude protein content — Part 2: Cereals, pulses and milled cereal products*

ISO 20483, *Cereals and pulses — Determination of the nitrogen content and calculation of the crude protein content — Kjeldahl method*

ISO 21527-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 2: Colony count technique in products with water activity less than or equal to 0.95*

ISO 24557, *Pulses — Determination of moisture content — Air-oven method*

3 Definitions

For the purpose of this standard the following definitions apply.

3.1
green grams
dry whole grains of *vigna radiata*

3.2
damaged grains
grains which are distinctly identified as having been visibly affected by insects, fungi, heat, water, disease or any other causative agent. These include grains that are damaged or split in the process of handling or those that are off colour.

3.3
immature grains
Grains which are not fully developed, normally smaller in size than the mature grins, shrivelled and off colour.

3.4
objectionable odours
odours which are entirely foreign to green grams and which, because of their presence, render green grams unfit for human consumption

3.5
pest infestation
Presence of live insects or other organisms, either in adult or other development stages.

3.6
foreign matter
any extraneous matter than green grams or other food grains comprising of

(a) "inorganic matter" includes metallic pieces, shale, glass, dust, sand, gravel, stones, dirt, pebbles, lumps or earth, clay, mud and animal filth etc;

(b) "organic matter" consisting of detached seed coats, straws, weeds and other inedible grains etc.

3.7
type admixture
Other grams that are not green grams.

4 Quality requirements

4.1 General requirements

Green grams shall meet the following general requirements/limits as determined using the relevant standards listed in Clause 2. Green grams;

a) shall be the dried mature seeds of pulse green gram (*Phaseolus aurues Roxb. or phaseolus radiatus Roxb);*

b) be well-filled, smooth, hard, clean, wholesome, uniform in size, shape, colour and in sound merchantable condition;

c) shall be free from substances which render them unfit for human or animal consumption or processing into or utilization thereof as food or feed;

d) shall be free of pests, live animals, animal carcasses, animal droppings, fungus infestation, added colouring matter, moulds, weevils, obnoxious substances, glass, metal, coal, dung, discoloration and all other impurities that represent a hazard to human health;

e) shall be free from abnormal flavours, musty, sour or other undesirable odour, obnoxious smell and discoloration;

f) shall be free from micro-organisms and substances originating from micro-organisms, fungi or other poisonous or deleterious substances in amounts that may constitute a hazard to human health.

g) shall be free from toxic or noxious seeds that are commonly recognized as harmful to health;

i) shall contain no chemical residues which exceed the prescribed maximum residue limit;

j) shall contain not more than 10 µm per kilogram aflatoxin of which not more than 5 µm per kilogram may be aflatoxin B_1.

4.2 Specific requirements

4.2.1 Grading

Green grams may be graded into three grades on the basis of the tolerable limits established in Table 1 which shall be additional to the general requirements set out in this standard.

Table 1 — Specific requirements

Characteristics		Maximum limits			Method of test
		Grade 1	Grade 2	Grade 3	
Moisture, % max m/m		14.0	14.0	14.0	ISO 24557
Purity, % min m/m		99.0	99.0	99.0	
Defective, % max m/m		2.0	4.0	6.0	
Immature grain % max m/m		2.0%	3.0	4.0	
Contrasting classes		0.5%	1.0	2.0	
Classes that blend max % m/m		5.0	10.0	15.0	
Germination, excluding hard seeds		90 %	n/a	n/a	
Sprout test		Suitable	n/a	n/a	
Foreign material, % max m/m	Organic	0.65	0.65	0.65	ISO 605
	Inorganic	0.25	0.25	0.25	
	Filth	0.1	0.1	0.1	
Other edible grains %max m/m Any edible grains (including oilseeds) other than green grams		0.1	0.5	3.0	
Inset /pest damaged % max m/m Grains per cent by count clean-cut weevil bored		1	2	3	
Total Aflatoxin (AFB_1+AFB_2+AFG_1 +AFG_2)), ppb		10			ISO 16050
Aflatoxin B1 only, ppb		5			
Fumonisin, ppm		2			AOAC 2001.04

4.2.2 Ungraded green grams

Ungraded green grams shall be green grams which do not fall within the requirements of Grades 1, 2 and 3 of this standard but meet the minimum requirements provided in 4.1 and are not rejected green grams. Ungraded green grams can be sorted out to Grade 1, 2 or 3 in accordance with the relevant procedures.

4.2.3 Reject grade green grams

Reject green grams shall be peas which are musty, sour, heating, materially weathered, or weevily; which have any commercially objectionable odour; which contain insect webbing or filth, animal filth, any unknown foreign substance, broken glass, or metal fragments; or which are otherwise of distinctly low quality. The characteristics are not within the parameters specified in Table 1. They cannot satisfy the conditions of under grade green grams and shall be graded as reject green grams and shall be regarded as unfit for human or animal consumption.

5 Contaminants

5.1 Heavy metals

Dry green grams shall comply with those maximum limits for heavy metals established by the Codex Alimentarius Commission for this commodity.

5.2 Pesticide residues

Dry green grams shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity

5.3 Mycotoxin limits

Dry green grams shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity. In particular, total aflatoxin levels in Dry green grams for human consumption shall not exceed 10 µg/kg (ppb) with B_1 not exceeding 5 µg/kg (ppb) when tested according to ISO 16050.

6 Hygiene

6.1 Dry green grams shall be produced, prepared and handled in accordance with the provisions of appropriate sections of ARS 53.

6.2 When tested by appropriate standards of sampling and examination listed in Clause 2, the products:

— shall be free from microorganisms in amounts which may represent a hazard to health and shall not exceed the limits stipulated in Table 2;

— shall be free from parasites which may represent a hazard to health; and

— shall not contain any substance originating from microorganisms in amounts which may represent a hazard to health.

Table 2 — Microbiological limits

	Type of micro-organism	**Limits**	**Test method**
i)	Yeasts and moulds, max. per g	10^5	ISO 21527-2
ii)	*Staphylococcus aureus* per 25 g	Not detectable	ISO 6888
iii)	*E. Coli*, max. per g	Not detectable	ISO 7251
iv)	*Salmonella,* max. per 25 g	Not detectable	ISO 6579

7 Packaging

7.1 Dry green grams shall be packed in suitable packages which shall be clean, sound, free from insect, fungal infestation and the packing material shall be of food grade quality.

7.2 Dry green grams shall be packed in containers which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the products.

7.3 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They shall not impart any toxic substance or undesirable odour or flavour to the product.

7.4 Each package shall contain Dry green grams of the same type and of the same grade designation.

7.5 If Dry green grams are presented in bags, the bags shall also be free of pests and contaminants.

7.6 Each package shall be securely closed and sealed.

8 Labelling

8.1 In addition to the requirements in ARS 56, each package shall be legibly and indelibly marked with the following:

i) product name as “Dry green grams”;

ii) variety;

iii) grade;

iv) name, address and physical location of the producer/ packer/importer;

v) lot/batch/code number;

vi) net weight, in kg;

vii) the declaration “Food for Human Consumption’’

viii) storage instruction as “Store in a cool dry place away from any contaminants’’;

ix) crop year;

x) packing date;

xi) instructions on disposal of used package;

xii) country of origin;

xiii) a declaration on whether the green grams were genetically modified or not.

8.2 Labelling of non-retail containers

Information for non-retail containers shall either be given on the container or in accompanying documents, except that the name of the product, lot identification and the name and address of the manufacturer or packer shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

9 Sampling methods

Sampling shall be done in accordance with the ISO 13690.

Bibliography

EAS 331:2011, *Green grams — Specification*

Pulses Grading and Marking Rules, 2003, Schedule V, *Grade designation and definition of quality of Moong (whole)*, Ministry of Agriculture, India, 7th April 2004

CODEX STAN 171:1989 (Rev. 1:1995), *Standard for Certain Pulses*